

FERDINAND STATE FOREST LAKE

Dubois County

2008 Largemouth Bass Population Estimate, Panfish Assessment,
and Aquatic Vegetation Survey Results

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EXECUTIVE SUMMARY

- Ferdinand State Forest Lake is a 42-acre impoundment located in Dubois County.
- A largemouth bass population estimate was conducted in April and May 2008. A panfish assessment was conducted in May that targeted bluegill and redear sunfish. Night electrofishing was the only sampling gear used during both investigations. An aquatic vegetation survey was conducted in July.
- A total of 1,523 largemouth bass was sampled during the population estimate. They ranged in length from 4.8 to 21.9 in. The population estimate for all bass was 3,630 which was significantly higher than all previous estimates.
- A total of 165 bluegill was sampled that weighed 28 lbs. They ranged in length from 1.0 to 9.2 in. The electrofishing catch rate was 330.0/h. Most of the stock indices were similar to 2005 results. Bluegill growth was excellent.
- A total of 114 redear sunfish was sampled that weighed 59 lbs. They ranged in length from 3.7 to 10.3 in. The electrofishing catch rate was 228.0/h. Redear growth was excellent.
- Both bass and bluegill fishing have improved since the imposition of the slot limit. The bass population estimates have shown a significant decrease in the number of bass between 8 and 12 in and an increase in the number of 15 in and larger bass prior to this survey. This year was the first significant increase in bass numbers and decrease in stock indices since the slot limit went into effect.
- A bass population estimate and panfish assessment should be conducted in 2010 following the 2008 procedures.

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INTRODUCTION

Ferdinand State Forest Lake is a 42-acre impoundment built in 1953 by the Works Progress Administration. The lake is located in Ferdinand State Forest approximately 7 mi east of the Town of Ferdinand. Facilities around the lake consist of a swimming beach, two one-lane boat ramps, boat rental, picnicking shelters, and a campground. Approximately 60% of the shoreline is accessible to bank fishing. There is a \$4.00 daily entrance fee (\$5.00 on weekends) and boat launching requires the \$20.00 Department of Natural Resources annual Lake Permit. The permit is needed for all motor boats that use State Park, State Reservoir, and State Forest properties. Annual entrance passes are available.

A largemouth bass 14-in minimum length limit was established in 1973. In January 2002, the bass regulation was changed to a 12 to 15-in protective slot limit. The slot limit was enacted to improve the size structure of the largemouth bass population. Channel catfish are stocked at a rate of 13/acre (546 fish) every two years and the last stocking occurred in 2008.

The last largemouth bass population estimate and panfish assessment occurred in 2005 (Carnahan 2006). Those results were impressive. The bass population's size structure continued to improve with more larger bass and fewer small bass. The bluegill fishing also improved as all the stock density indices improved from 2003 to 2005. Bluegill fishing was classified as excellent.

METHODS

Aquatic Vegetation Survey

An aquatic vegetation survey was conducted on July 16 according to Pearson's sampling methods (2004). Thirty random sites were sampled.

Largemouth Bass Population Estimate

Largemouth bass sampling effort consisted of 1.51 h on April 3, 1.56 h on April 7, and 1.35 h on May 12, 2008 of pulsed DC night electrofishing. Two dippers collected the stunned bass. All bass were measured to the nearest 0.1 in and the left pectoral fin was removed to mark each bass captured. The population size was estimated using the Schnabel population estimate as described by Ricker (1975). Stock density indices (PSD and RSD) were used to help assess the largemouth bass population (Anderson and Neumann 1996). Scale samples were taken to determine ages. Weights were measured to the 0.01 lb on a subsample of bass. A single factor

analysis of variance statistical test was used to compare some of the pre and post slot limit bass data. All the previous population estimates were conducted using the same methods.

Panfish Assessment

Bluegill and redear sunfish were sampled on May 7, 2008. Fish collection effort consisted of 0.5 h of pulsed DC night electrofishing. Two dippers collected the stunned fish. Bluegill and redear sunfish were measured to the nearest 0.1 in and weights were estimated from district averages. Stock density indices (PSD, RSD, and BGFP) were used to assess the bluegill population (Ball and Tousignant 1996). Scale samples were taken to determine ages.

RESULTS

Aquatic Vegetation Survey

Southern naiad and brittle naiad were the only submersed plants found. Southern naiad was sampled at 27% of the sites while brittle naiad occurred at 7% of the sites (Appendix). Emergent species observed were bulrush, creeping water primrose, cattail spp., and water willow. None of the plants were abundant enough to inhibit angler access.

Largemouth Bass Population Estimate

A total of 1,523 largemouth bass was sampled during the population estimate. They ranged in length from 4.8 to 21.9 in. The population estimate for all bass was 3,630 (95% CI = 3,177 to 4,188; SE = 7%) which was significantly higher than all previous estimates ($F(1,4) = 8$, $P = 0.04$) (Table 1). The population was also estimated for different length groups. Those results are as follows; greater than 8 in was 1,529, greater than 12 in was 720, and greater than 15 in was 54. The CI and SE for each group are in Table 1.

The all bass greater than 8 in and greater than 12 in bass population estimates were significantly higher ($(F(1,1) = 1,469, P = 0.01)$; $(F(1,1) = 3,560,813, P < 0.01)$; $(F(1,1) = 1,566, P = 0.01)$) than the previous two estimates (2003, 2005). The greater than 15 in estimate was not significantly different from the last two estimates, but was significantly higher when the population estimates were compared between the 14 in minimum and the slot limit regulations ($F(1,4) = 12, P = 0.02$).

The electrofishing catch rate was 344.3/h. Previous catch rates were 392.0/h (1994), 379.0/h (2001), 264.0/h (2002), 207.0/h (2003), and 182.0/h (2005). This year's catch rates by

size classes follow the same trend as the population estimate. They have all increased since 2005 for bass less than 15 in (Table 2).

Largemouth bass proportional stock density (PSD) and relative stock density (RSD-14 and RSD-15) indices have all improved since the slot limit imposition (Table 3). The bass PSD's were significantly higher from 2003 through 2008 when compared to pre-slot limit years ($F(1,5) = 57, P < 0.01$). The 2008 PSD was 41. The RSD-14 and RSD-15 values decreased from 2005 (17 to 9 and 11 to 5), but they are still significantly higher than pre-slot limit years ($F(1,5) = 16, P < 0.01$) and ($F(1,5) = 10, P = 0.02$)).

Bass growth was average when compared to district averages. Bass growth has not significantly improved since the imposition of the slot limit, however, few age-6 and older bass were ever sampled before the slot limit went into effect. In 2008, an age-5 bass averaged 13.7 in compared to 15.4 in in 2005 (Appendix). Bass grew about an inch slower in 2008 versus 2005 for age-2 and older bass.

Panfish Assessment

A total of 165 bluegill was sampled that weighed 28 lbs. They ranged in length from 1.0 to 9.2 in. The electrofishing catch rate was 330.0/h. Previous catch rates have ranged from 179.0 (1997) to 1,216.0/h (2002) (Table 4). Bluegill PSD's have increased from 21 (2001) to 57. The RSD-7 index value increased from 11 (2002) to 46, and the RSD-8 value increased from 1 (2003) to 26. The bluegill fishing potential index (BGFP) score increased from a low of 24 (2003) to 27 which rates bluegill fishing as excellent. Most of the stock indices were similar to 2005 results. Bluegill growth was excellent at nearly an inch better than the district average for age-2 and older bluegill. Age-5 and age-6 bluegill averaged 8.2 and 9.3 in, respectively.

A total of 114 redear sunfish was sampled that weighed 59 lbs. They ranged in length from 3.7 to 10.3 in. The electrofishing catch rate was 228.0/h. Previous electrofishing catch rates ranged from 50.0/h (2003) to 478.0/h (2002). Redear growth was excellent compared to the district averages. Redear averaged 8.8 in at age 4 and 9.6 in at age 5.

DISCUSSION

Both bass and bluegill fishing have improved since the imposition of the slot limit. The bass population estimates have shown a significant decrease in the number of bass between 8 and 12 in and an increase in the number of 15 in and larger bass prior to this survey. This year was

the first significant increase in bass numbers and decrease in stock indices since the slot limit went into effect. Overall, the bass reduction has improved bass growth, hence increasing the number of larger bass in the lake. Bass fishing for larger bass should improve if anglers continue to harvest small bass.

Typically, a few years after a slot limit has been imposed, anglers harvest fewer bass basically turning the slot into a self imposed 15 in minimum length limit. This same phenomenon occurred at Ferdinand as shown by the decreased rate of exploitation (u) and annual mortality rates (A) in 2003 and 2005. Exploitation and total annual mortality decreased by 44% and 21% from 2001 and 2002 rates. The exploitation and total annual mortality did increase in 2008 to near 2002 levels. Anglers are either harvesting bass when their population is noticeably higher or it is a natural fluctuation in angler attitudes. It appears if exploitation drops to 25% (as it did in 2003 and 2005) the bass population will increase to the point that it will negatively affect bass growth. Anglers need to continually harvest small bass for this lake to have better fishing.

A concern with implementing the slot limit was being able to maintain the good bluegill fishing. Bluegill populations can become stunted if too many predators are removed from a lake. Currently, this is not occurring. The bluegill electrofishing catch rate has remained at 2005 levels. All the bluegill stock densities were excellent indicating that the lake has exceptional bluegill fishing.

The redear sunfish population is a bonus to panfish anglers at this lake. Their electrofishing catch rate has fluctuated over the last few years, but was high again in 2008. Many big redear are in the population.

Ferdinand State Forest Lake has always possessed a good bluegill fishery and a rather mediocre bass fishery. The goal of the slot limit was to improve bass fishing, while still maintaining a good bluegill fishery. So far this has been accomplished. However, the fishery needs to be monitored to ensure the slot limit does not allow the bluegill population to become over populated. It is recommended that a bass population estimate and panfish assessment be conducted in 2010 following the same procedures as in 2008.

RECOMMENDATIONS

- A bass population estimate and panfish assessment should be conducted in 2010 following the 2008 procedures.

LITERATURE CITED

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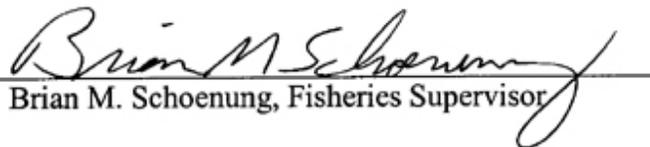
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Submitted by: Daniel P. Carnahan, Fisheries Biologist

Date: November 10, 2008

Approved by:


Brian M. Schoenung, Fisheries Supervisor

Date: March 5, 2009

Table 1. Schnabel population estimate for largemouth bass at Ferdinand State Forest Lake, 1994 through 2008.

Year	95% low CI	Estimate	95% high CI	SE %
<u>ALL LARGEMOUTH BASS</u>				
1994	1,705	1,950	2,253	7.1
2001	2,404	2,758	3,197	7.3
2002	1,277	1,466	1,700	7.3
2003	1,258	1,453	1,698	7.6
2005	1,293	1,518	1,807	8.5
2008	3,177	3,630	4,188	7.0
<u>LARGEMOUTH BASS ≥ 8 INCHES</u>				
1994	1,190	1,367	1,588	7.3
2001	882	1,074	1,338	10.6
2002	1,001	1,159	1,358	7.8
2003	668	568	1,209	11.8
2005	464	567	711	10.8
2008	1,275	1,529	1,868	9.7
<u>LARGEMOUTH BASS ≥ 12 INCHES</u>				
1994	72	111	177	22.4
2001	21	42	102	44.7
2002	82	149	298	31.6
2003	154	178	469	22.9
2005	120	162	224	15.6
2008	526	720	1,014	16.2
<u>LARGEMOUTH BASS ≥ 15 INCHES</u>				
1994	6	16	40	57.7
2001	0	0	0	0.0
2002	0	2	3	70.7
2003	10	28	69	57.7
2005	35	66	135	33.3
2008	26	54	125	40.8

Table 2. Largemouth bass electrofishing catch rates by length group, Ferdinand State Forest Lake, 1994 through 2008.

Length (in)	CATCH PER HOUR					
	1994	2001	2002	2003	2005	2008
< 8.0	75	215	44	124	93	182
8.0 - 11.9	282	158	202	60	57	95
12.0 - 15.0	30	9	18	20	24	60
15.1 - 18.0	3	<1	<1	3	8	4
>18.0	3	<1	0	<1	2	3
Totals	393	382	264	207	182	344

Table 3. Ferdinand State Forest Lake largemouth bass stock density indices, 1994 through 2008.

Year	PSD	RSD-14	RSD-15
1994	11	3	1
1997	10	2	<1
2001	6	<1	<1
2002	9	3	1
2003	28	9	4
2005	37	17	11
2008	41	9	5

Table 4. Bluegill stock density indices and electrofishing catch rates, Ferdinand State Forest Lake, 1997 through 2008.

Year	PSD	RSD-7	RSD-8	BGFP	Electrofishing CPUE
1997	53	42	23	29	179
2001	21	14	2	30	650
2002	27	11	2	31	1,216
2003	35	16	1	24	772
2005	55	47	20	27	337
2008	57	46	26	27	330

Appendix

2008 survey data.

LAKE SURVEY REPORT

Type of Survey	<input type="checkbox"/> Initial Survey	<input checked="" type="checkbox"/> Re-Survey
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Lake Name Ferdinand State Forest Lake	County Dubois	Date of survey (Month, day, year) April 3 to May 12, 2008
Biologist's name Daniel P. Carnahan		Date of approval (Month, day, year) March 5, 2009

LOCATION		
Quadrangle Name St. Anthony	Range 3W	Section 18
Township Name 3S	Nearest Town Ferdinand	

ACCESSIBILITY					
State owned public access site Two, one lane boat ramps		Privately owned public access site		Other access site	
Surface acres 42	Maximum depth 20 ft	Average depth 9 ft	Acre feet 378	Water level 482	Extreme fluctuations 2 ft
Location of benchmark Unknown					

INLETS		
Name Intermittent stream	Location S18, NE¼, SW¼	Origin Runoff
Intermittent stream	S18, NE¼, SW¼	Runoff

OUTLETS									
Name Fork of Hurricane Creek	Location S18, SE¼, SE¼								
Water level control Earthen dam with concrete drop box and drain valve.									
POOL	ELEVATION (Feet MSL)	ACRES							
TOP OF DAM									
TOP OF FLOOD CONTROL POOL		42							
TOP OF CONSERVATION POOL									
TOP OF MINIMUM POOL									
STREAMBED									
<table border="0"> <tr> <td rowspan="5" style="vertical-align: middle;">Bottom type</td> <td><input type="checkbox"/> Boulder</td> </tr> <tr> <td><input type="checkbox"/> Gravel</td> </tr> <tr> <td><input type="checkbox"/> Sand</td> </tr> <tr> <td><input checked="" type="checkbox"/> Muck</td> </tr> <tr> <td><input checked="" type="checkbox"/> Clay</td> </tr> <tr> <td><input type="checkbox"/> Marl</td> </tr> </table>			Bottom type	<input type="checkbox"/> Boulder	<input type="checkbox"/> Gravel	<input type="checkbox"/> Sand	<input checked="" type="checkbox"/> Muck	<input checked="" type="checkbox"/> Clay	<input type="checkbox"/> Marl
Bottom type	<input type="checkbox"/> Boulder								
	<input type="checkbox"/> Gravel								
	<input type="checkbox"/> Sand								
	<input checked="" type="checkbox"/> Muck								
	<input checked="" type="checkbox"/> Clay								
<input type="checkbox"/> Marl									
Watershed use 75% forested, 25% agriculture									
Development of shoreline Beach, Boat livery									
Previous surveys and investigations Standard Fisheries survey: 1963, 1967, 1970, 1973, 1976, 1984, 1987, 1993 and 1997.									
Largemouth bass population estimate: 1994, 2001, 2002, 2003, and 2005.									
Bluegill and redear sunfish sampling: 2001, 2002, 2003, and 2005. Aquatic vegetation survey: 2005, 2008.									

Occurrence and Abundance of Submersed Aquatic Plants

Lake: Ferdinand State Forest Lake	Secchi (ft): 3.7	SE Mean Species / Site: 0.10
Date: 7/16/2008	Littoral Sites w/Plants: 9	Mean Natives / Site: 0.33
Littoral Depth (ft): 4.5	Number of Species: 2	SE Mean Natives / Site: 0.10
Littoral Sites: 9	Max. Species / Site: 2	Species Diversity: 0.32
Total Sites: 30	Mean Species / Site: 0.33	Native Diversity: 0.32

<u>Species</u>	Frequency of	<u>Score Frequency</u>				<u>Dominance</u>
	<u>Occurrence</u>	<u>0</u>	<u>1</u>	<u>3</u>	<u>5</u>	
Southern naiad	26.7	73.3	23.3	3.3	0	6.7
Brittle naiad	6.7	93.3	6.7	0	0	1.3

Other species noted:

bulrush spp., creeping water primrose, cattail spp., water willow, filamentous algae

NUMBER, PERCENTAGE, WEIGHT, AND AGE OF LARGEMOUTH BASS

TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH
1.0					19.0	1	0.1	4.60	not aged
1.5					19.5	1	0.1	3.75	7
2.0					20.0				
2.5					20.5	1	0.1	5.50	8
3.0					21.0	3	0.2	5.25	9
3.5					21.5	2	0.1	5.50	10
4.0					22.0				
4.5	2	0.1	0.03	1	22.5				
5.0	8	0.5	0.05	1, 2	23.0				
5.5	31	2.0	0.07	1, 2	23.5				
6.0	123	8.1	0.09	1, 2	24.0				
6.5	237	15.6	0.11	1, 2	24.5				
7.0	255	16.7	0.15	2	25.0				
7.5	147	9.7	0.20	2	25.5				
8.0	83	5.4	0.22	2	26.0				
8.5	41	2.7	0.27	2, 3	TOTAL	1,523			
9.0	9	0.6	0.36	2, 3					
9.5	15	1.0	0.41	3					
10.0	27	1.8	0.49	3					
10.5	39	2.6	0.58	3					
11.0	89	5.8	0.64	3					
11.5	118	7.7	0.68	3, 4					
12.0	122	8.0	0.80	3, 4					
12.5	66	4.3	0.92	4, 5					
13.0	28	1.8	0.89	4, 5					
13.5	19	1.2	1.18	4, 5					
14.0	19	1.2	1.49	5					
14.5	11	0.7	1.61	5, 6					
15.0	9	0.6	1.76	5, 6					
15.5	4	0.3	2.26	6					
16.0	2	0.1	1.95	6					
16.5	1	0.1	2.66	6					
17.0	3	0.2	2.60	6					
17.5									
18.0	2	0.1	3.25	6, 7					
18.5	5	0.3	4.17	7					

ELECTROFISHING CATCH	344.3/h	GILL NET CATCH	N/A	TRAP NET CATCH	N/A
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NUMBER, PERCENTAGE, WEIGHT, AND AGE OF BLUEGILL									
TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH
1.0	8	4.8	0.01	not aged	19.0				
1.5	21	12.7	0.01	1	19.5				
2.0	6	3.6	0.01	1	20.0				
2.5	9	5.5	0.01	1	20.5				
3.0	5	3.0	0.02	1	21.0				
3.5	5	3.0	0.03	1, 2	21.5				
4.0	5	3.0	0.05	2	22.0				
4.5	16	9.7	0.07	2	22.5				
5.0	15	9.1	0.09	2, 3	23.0				
5.5	6	3.6	0.13	2, 3	23.5				
6.0	4	2.4	0.17	3	24.0				
6.5	9	5.5	0.22	2, 3, 4	24.5				
7.0	10	6.1	0.28	3, 4, 5	25.0				
7.5	14	8.5	0.34	4, 5	25.5				
8.0	23	13.9	0.41	4, 5	26.0				
8.5	8	4.8	0.49	5	TOTAL	165			
9.0	1	0.6	0.58	6					
9.5									
10.0									
10.5									
11.0									
11.5									
12.0									
12.5									
13.0									
13.5									
14.0									
14.5									
15.0									
15.5									
16.0									
16.5									
17.0									
17.5									
18.0									
18.5									

ELECTROFISHING CATCH	330.0/h	GILL NET CATCH	N/A	TRAP NET CATCH	N/A
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NUMBER, PERCENTAGE, WEIGHT, AND AGE OF REDEAR SUNFISH

TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH
1.0					19.0				
1.5					19.5				
2.0					20.0				
2.5					20.5				
3.0					21.0				
3.5	1	0.9	0.03	1	21.5				
4.0	1	0.9	0.05	1	22.0				
4.5	1	0.9	0.07	2	22.5				
5.0					23.0				
5.5	2	1.8	0.13	2, 3	23.5				
6.0	6	5.3	0.17	2	24.0				
6.5	3	2.6	0.22	2	24.5				
7.0	2	1.8	0.27	2, 3	25.0				
7.5	1	0.9	0.33	3	25.5				
8.0	10	8.8	0.40	3, 4	26.0				
8.5	18	15.8	0.48	3, 4	TOTAL	114			
9.0	32	28.1	0.57	4, 5					
9.5	27	23.7	0.66	5					
10.0	10	8.8	0.76	5					
10.5									
11.0									
11.5									
12.0									
12.5									
13.0									
13.5									
14.0									
14.5									
15.0									
15.5									
16.0									
16.5									
17.0									
17.5									
18.0									
18.5									

ELECTROFISHING CATCH	228.0/h	GILL NET CATCH	N/A	TRAP NET CATCH	N/A
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LARGEMOUTH BASS AGE-LENGTH KEY

Length group (in)	Total number	Sub-sample	Age																	
			1	2	3	4	5	6	7	8	9	10								
4.5	2	2	2																	
5.0	8	6	7	1																
5.5	31	7	18	13																
6.0	123	7	35	88																
6.5	237	7	34	203																
7.0	255	7		255																
7.5	147	7		147																
8.0	83	6		83																
8.5	41	7		35	6															
9.0	9	5		2	7															
9.5	15	6			15															
10.0	27	6			27															
10.5	39	6			39															
11.0	89	7			89															
11.5	118	7			101	17														
12.0	122	7			70	52														
12.5	66	7				47	19													
13.0	28	6				14	14													
13.5	19	5				4	15													
14.0	19	7					19													
14.5	11	7					9	2												
15.0	9	8					5	5												
15.5	4	4						4												
16.0	2	1						2												
16.5	1	1						1												
17.0	3	2						3												
17.5																				
18.0	2	2							1	1										
18.5	5	3								5										
19.0	1																			
19.5	1	1								1										
20.0																				
20.5	1	1											1							
21.0	3	1																3		
21.5	2	2																		2
Totals	1,523	158	95	828	354	134	81	17	7	1	3									2

Age	Number	Mean length	Var	SE	Lower 95%CI	Upper 95%CI
1	95	6.2	0.25	0.05	6.1	6.3
2	828	7.3	0.46	0.02	7.2	7.3
3	354	11.3	0.65	0.04	11.2	11.4
4	134	12.5	0.22	0.04	12.4	12.6
5	81	13.7	0.58	0.08	13.6	13.9
6	17	16.1	0.97	0.24	15.6	16.5
7	7	18.8	0.20	0.17	18.5	19.2
8	1	20.8				
9	3	21.3	0.00	0.00	21.3	21.3
10	2	21.8	0.00	0.00	21.8	21.8

BLUEGILL AGE-LENGTH KEY

Length group (in)	Total number	Sub-sample	Age						
			1	2	3	4	5	6	
1.0	8								
1.5	21	5	21						
2.0	6	4	6						
2.5	9	4	9						
3.0	5	3	5						
3.5	5	5	3	2					
4.0	5	5		5					
4.5	16	5		16					
5.0	15	5		12	3				
5.5	6	6		5	1				
6.0	4	3			4				
6.5	9	6		2	2	6			
7.0	10	5			2	6	2		
7.5	14	5				6	8		
8.0	23	6				12	12		
8.5	8	4					8		
9.0	1	1							1
Totals	165	72	44	42	12	29	30		1

Age	Number	Mean length	Var	SE	Lower 95%CI	Upper 95%CI
1	44	2.3	0.44	0.10	2.1	2.5
2	42	5.0	0.37	0.09	4.8	5.2
3	12	6.2	0.53	0.21	5.8	6.6
4	29	7.6	0.36	0.11	7.4	7.9
5	30	8.2	0.21	0.08	8.0	8.3
6	1	9.3				

REDEAR SUNFISH AGE-LENGTH KEY

Length group (in)	Total number	Sub-sample	Age					
			1	2	3	4	5	
3.5	1	1	1					
4.0	1	1	1					
4.5	1	1		1				
5.0								
5.5	2	2		1	1			
6.0	6	6		6				
6.5	3	4		3				
7.0	2	2		1	1			
7.5	1	1			1			
8.0	10	5			6	4		
8.5	18	5			7	11		
9.0	32	5				6	26	
9.5	27	4					27	
10.0	10	5					10	
Totals	114	42	2	12	16	21	63	

Age	Number	Mean length	Var	SE	Lower 95%CI	Upper 95%CI
1	2	4.0	0.13	0.25	3.5	4.5
2	12	6.3	0.38	0.18	5.9	6.6
3	16	8.2	0.61	0.19	7.8	8.6
4	21	8.8	0.13	0.08	8.7	9.0
5	63	9.6	0.13	0.05	9.5	9.7

GPS LOCATION OF SAMPLING EQUIPMENT

GILL NETS			TRAP NETS			ELECTROFISHING				
1	N	W	1	N	W	1	Largemouth Bass Electrofishing			
2	N	W	2	N	W		N	38.25507	W	-86.77335
3	N	W	3	N	W		N	38.25507	W	-86.77335
4	N	W	4	N	W					
5	N	W	5	N	W					
6	N	W	6	N	W					
7	N	W	7	N	W	1	Bluegill Electrofishing			
8	N	W	8	N	W		N	38.25611	W	-86.77785
9	N	W	9	N	W	2	N	38.25510	W	-86.77376
10	N	W	10	N	W		N	38.25507	W	-86.77335
11	N	W	11	N	W	3	N	38.25266	W	-86.77241
12	N	W	12	N	W		N		W	
13	N	W	13	N	W	4	N		W	
14	N	W	14	N	W		N		W	
15	N	W	15	N	W	5	N		W	
16	N	W	16	N	W		N		W	
17	N	W	17	N	W	6	N		W	
18	N	W	18	N	W		N		W	
19	N	W	19	N	W	7	N		W	
20	N	W	20	N	W		N		W	
						8	N		W	
							N		W	
						9	N		W	
							N		W	
						10	N		W	
							N		W	
						11	N		W	
							N		W	
						12	N		W	
							N		W	
						13	N		W	
							N		W	
						14	N		W	
							N		W	
						15	N		W	
							N		W	
						16	N		W	
							N		W	
						17	N		W	
							N		W	